

## 1) Intro, purpose, and explanation of chapter layout

## 2) Osc theory summary (Parke, de Gouvea)

- a) Introduction
- b) Neutrino mixing: Three-flavor neutrino oscillations
- c) Matter effects
- d) Summary of current parameter knowledge
- e) Appearance and disappearance channels Including: which measurements are interesting:
  - i.  $\theta_{13}$ ,
  - ii. CP measurements
  - iii. mass hierarchy
  - iv. deviations from max. Mixing
- f) Complementarity to reactor experiments
- g) What if MiniBOONE confirms LSND? -> Steriles, CPT violation ...
- h) Some other "new" physics possibilities

## 3) Theoretical motivation for neutrino oscillation measurements (Antusch, Lindner, Kersten, Ratz)

- a) Maybe some introduction about the generation of neutrino mass; Dirac/Majorana; see-saw
- b) Predictions from theoretical models (incl. GUTs, bottom-ups, anarchy etc)
  - i.  $\theta_{13}$
  - ii. Deviations from max. Mixing
  - iii. Mass schemes
  - iv. Maybe something about Dirac CP phase!?
  - v. Conclusion: Parameter predictions are within mid-term experimental reach
- c) Implications of RG running
  - i. Conclusions: zero  $\theta_{13}$  and  $\theta_{23}$  very close to maximal unlikely (with caveats)
- d) Impact of future measurements to model selection and theoretical predictions
  - i. Conclusion: Measurements help to select models or force theory to do it better

## 4) Where we may be in 10 years time (Shaevitz, Brice)

- a) Describe experiments that have yet to release results, but will have in 10 years time.
- b) Scenarios for where we may be in 10 years time
  - i.  $\text{SIN}^2 2\theta_{13}$  greater than  $\sim 0.04$
  - ii.  $\text{SIN}^2 2\theta_{13}$  between  $\sim 0.01$  and  $\sim 0.04$
  - iii.  $\text{SIN}^2 2\theta_{13}$  less than  $\sim 0.01$
  - iv. LSND oscillation confirmed by MiniBooNE
  - v.  $\text{SIN}^2 2\theta_{23}$  still consistent with 1
  - vi. Something unexpected

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## 5) $\text{SIN}^2 2\theta_{13}$ Greater Than $\sim 0.04$

- a) Can use existing NuMI beamline
- b) Nova (Feldman)

## 6) $\text{SIN}^2 2\theta_{13}$ Between $\sim 0.01$ and $\sim 0.04$

- a) Need new beamline or larger detectors
- b) Super Nova, other off-axis (Feldman)
- c) FeHo (Michael)
- d) Broadband scheme (Diwan)
- e) FNAL to China (de Jongh)

## 7) $\text{SIN}^2 2\theta_{13}$ Less Than $\sim 0.01$

- a) Search with experiments from previous chapter
- b) Betabeam (Finley and Jansson)
- c) Neutrino Factory (Geer)

## 8) Other Possibilities

- a) LSND oscillation confirmed by MiniBooNE
  - i. Decay at rest source (Van de Water)
  - ii. NUMI numu to nutau & numu disappearance (Bazarko)
  - iii. Effect on LBL measurements
- b)  $\text{SIN}^2 2\theta_{23}$  still consistent with 1
  - i. Nova (Feldman)
- c) Something unexpected
  - i. ....

## 9) Summary